Cov. Doc Caceada, Agriculture, Department of Can
Repersmental Fanns

# EXPERIMENTAL FARM HIGHLIGHTS



# IN THE

# ATLANTIC PROVINCES

1957



Vegetable adaptation plots at the St. John's West Farm, Nfld.

EXPERIMENTAL FARMS SERVICE

CANADA DEPARTMENT OF AGRICULTURE



### **FOREWORD**

This bulletin is one of an annual series presenting a brief summary of the results of current investigations being conducted by the five Canada Experimental Farms in the Atlantic Provinces. These farms are located at Charlottetown, P.E.I., Fredericton, N.B., Kentville, N.S., Nappan, N.S., and St. John's West, Nfld.

Reports of this nature are intended to supplement the regular 5-year Progress Reports that are issued separately by each of the Farms, and are designed to provide interesting up-to-date highlights of the research at each unit. Because it is possible to include only brief statements on the projects, the reader is invited to write to the Superintendent of the unit concerned for further information on specific problems.

# Experimental Farms Service Canada Department of Agriculture Atlantic Provinces

## Professional Personnel

## Superintendents

Charlottetown, P.E.I. Fredericton, N.B. Kentville, N.S. Nappan, N.S. St. John's West, Nfld. R.C. Parent, M.S.A. S.A. Hilton, M.Sc. (Agr.) C.J. Bishop, Ph.D. S.B. Williams, M.Sc. H.W.R. Chancey, M.S.A.

## Animal Husbandry

Charlottetown, P.E.I. Fredericton, N.B. Nappan, N.S. J.W.G. Nicholson, M.Sc. R.J. Curtis, M.Sc. C.D.T. Cameron, M.Sc. L.S. Hamilton, B.Sc. (Agr.) V.G. MacKay, M.Sc.

## Cereal Crops

Charlottetown, P.E.I.

Fredericton, N.B. Nappan, N.S.

J.D.E. Sterling, M.Sc.

R.B. MacLaren

T.C. Chiasson, M.Sc.

F.S. Warren, Ph.D. H.A. Riordon, B.S.A.

# Field Husbandry

Charlottetown, P.E.I.

Fredericton, N.B.

Kentville, N.S. Nappan, N.S.

St. John's West, Nfld.

C.B. Whiteside, B.S.A.

K.E. LeLacheur, B.Sc. (Agr.)

A.A. MacLean, M.Sc. J.J. Doyle, Ph.D. C.F. Everett, M.Sc.

J.S. Leefe, B.S.A.

E.T. Goring, B.S.A. L.P. Jackson, M.S.

L.B. Macleod, M.Sc.

A.F. Rayment, M.Sc.

## Forage Crops

Charlottetown, P.E.I. Fredericton, N.B. Nappan, N.S.

#### Horticulture

Charlottetown, P.E.I.

Fredericton, N.B.

Kentville, N.S.

#### Illustration Stations

Charlottetown, P.E.I. Fredericton, N.B.

Kentville, N.S. Nappan, N.S. St. John's West, Nfld.

### Poultry

Charlottetown, P.E.I. Fredericton, N.B. Kentville, N.S. Nappan, N.S. K.F. LeLacheur, B.Sc. (Agr.) T.C. Chiasson, M.Sc. F.S. Warren, Ph.D. J.E. Langille, B.Sc. (Agr.)

D.A. Young, Ph.D.
G.C. Warren, B.S.A.
L.C. Young, M.Sc.
R.G. White, B.S.A.
H.T. Davies, B.S.A.
W.B. Collins, M.Sc.
L.E. Aalders, Ph.D.
E.W. Chipman, B.Sc. (Agr.)
D.L. Craig, M.Sc.
E.L. Eaton, M.S.A.
C.A. Eaves, M.Sc.
G.W. Hope, M.A.

G.W. Hope, M.A.
R.P. Longley, M.S.A.
D.C. MacKay, Ph.D.
G.S. Swain, B.S.A.

W.N. Black, B.Sc. (Agr.) E.A. Grant, B.Sc. (Agr.) J.E. Comeau, B.Sc. (Agr.) G.G. Smeltzer, B.Sc. (Agr.) F.W. Calder, B.Sc. (Agr.) O.S. Mabee, B.S.A.

Roy D. Crawford, M.Sc. L. Griesbach, M.Sc. L.G. Proudfoot, M.Sc. T.M. MacIntyre, M.Sc. R.E. Smith, M.Sc.



# Contents

Organization								9
Apiculture	•							10
Cattle								10
Swine					•	•		12
Poultry						•		12
Cereals		٠						15
Field Husbandry								17
Forage Crops .					•			21
Small Fruits								22
Tree Fruits						•		24
Vegetables				•				25
Potatoes								27
Subject Index .								30

Digitized by the Internet Archive in 2024 with funding from University of Toronto

#### ORGANIZATION

The Experimental Farms Service units co-operating in this publication, with brief notes on their organization and responsibilities, are as follows:

#### Nova Scotia

The Experimental Farm, Nappan, located in the northwestern part of the province, specializes in livestock breeding and nutrition; poultry nutrition; breeding and culture of field and forage crops; and dikeland utilization.

The Experimental Farm, Kentville, located in the Annapolis Valley, specializes in all phases of horticultural crop breeding, production, and utilization; and conducts research in poultry genetics.

*Illustration Stations*, numbering 15, are under the supervision of the Kentville and Nappan units.

The most recently established Station is at Bras d'Or, where experimental studies involving forage and grain varieties and problems related to cash crops are being undertaken.

#### Newfoundland

The Experimental Farm, St. John's West, is located in the most eastern section of the province. Research work is of a general nature with emphasis on fertility problems related to vegetable and forage production. Other studies include poultry nutrition and management, introductory orchard work, and investigations concerning potato wart disease, clubroot, and insect controls.

Three *Illustration Stations*, a Blueberry Substation, and a Peat Substation, are supervised by this unit.

#### New Brunswick

The Experimental Farm, Fredericton, is located in the west-central portion of the province in the St. John River Valley. While the research program is of a general nature, covering all phases of New Brunswick agriculture, plant nutrition, potato breeding, and broiler breeding and management are of a specialized nature.

Three Substations are administered from the Fredericton office as follows:

McDonald's Corner - A horticultural unit specializing in small fruit and vegetable breeding and production.

Tower Hill — Specializing in problems relating to the production of the native blueberry.

Alma - The isolation station for the potato breeding project.

Thirteen Illustration Stations are in operation in New Brunswick.

#### Prince Edward Island

The Experimental Farm, Charlottetown, deals with all problems relating to mixed farming in Prince Edward Island. Special attention is given to the breeding of cereal crops for the Atlantic Provinces, to soil fertility investigations, and to the breeding and nutrition of dairy cattle.

Eight Illustration Stations, including two in the Magdalen Islands, are under

the supervision of the Charlottetown unit.

#### Soil Survey

In all provinces the Experimental Farms Service (in co-operation with the Provincial Departments) is conducting Soil Surveys and the information so obtained is used by the soil fertility research officers in their study of plant nutrition problems.

#### APICULTURE

## Honeybees increase cucumber yields

Interesting results have been obtained at Charlottetown in studies concerning honeybees and their influence on the fruiting of pickling cucumbers. Experimental treatments included open pollinated plants, plants caged with and without bees, and caged plants treated with a commercial fruit set. Some plots were harvested regularly throughout the growing season while others were harvested in a single operation.

Results to date indicate that honeybees are necessary for high cucumber yields and that frequent handling during cropping tends to appreciably increase fruit set.

## Beekeeping possible in Newfoundland

Preliminary beekeeping studies at the St. John's West Experimental Farm indicate that honey production may be practical in Newfoundland. A weighed hive produced a net gain of 67 pounds in 1956 and a similar hive yielded a net gain of 116 pounds during 1957.

#### CATTLE

# Soybean oilmeal efficient supplement to broadleaf hay

Growing steers fed broadleaf hay as the only roughage made slower and less efficient gains than steers fed mixed hay during the winter feeding periods 1953-54 and 1954-55 at Nappan.

In a subsequent trial, 32 yearling beef steers were divided into two lots with all steers receiving broadleaf hay as the only roughage. Lot 1 received a barley-soybean oilmeal-salt concentrate mixture at the rate of 2 pounds per steer daily. Lot 2 received 1.25 pounds per steer daily of soybean oilmeal plus salt to provide the same amount of protein in the meal as Lot 1. The steers on the soybean oilmeal and salt mixture made more rapid gains and required 21 per cent less roughage and 50 per cent less meal per 100 pounds live weight gain than the steers on the barley-soybean oilmeal-salt concentrate mixture.

# Silage waste reduced by adjusting feed rack

The Shorthorn breeding females at the Nappan Experimental Farm were divided into two lots during the 1955-56 winter feeding period. Lot 1 received hay free choice and all the grass silage they would consume in one morning and one

feeding. The silage was cut from the face of a horizontal silo with a broad axe and thrown behind a feed rack arranged to prevent the cattle from reaching the face of the silage. Lot 2 received hay and silage free choice. The wastage of silage by the cows on hand-feeding was less than one-half the wastage incurred by those on self-feeding and there was little difference between the labor required for feeding Lot 1 and that required to remove the higher wastage in Lot 2.

This trial was repeated during the 1956-57 winter feeding period, but the feed rack for cows on silage free choice was moved further away from the face of the silo than in the previous year. Silage was eaten evenly across the face of the silo and wastage from frozen silage around the edges of holes eaten into the face of the silo during the first trial was eliminated. In addition, less silage was refused in front of the feed rack.

The proper spacing of the feed rack from the silo face is important if waste is to be avoided when silage is being self-fed and under certain conditions, a modified form of hand-feeding may be advantageous.

## Delayed response when limestone applied on sod

In a trial over the last four years at Nappan, on dikeland pasture which received an annual surface application of 1,000 pounds of ground limestone per acre, growing steers made 8 per cent more live weight gain per acre than did those pastured on unlimed dikeland. Responses from limestone varied from a depression in gain during 1953 to a maximum gain increase of 19 per cent over the unlimed pasture in 1957.

On heavy clay upland pasture receiving a similar annual surface application of ground limestone, increased yield over unlimed pasture varied from a 5 per cent live weight gain per acre in 1956 to a 45 per cent increase in 1957. The average gain increase from 1953 to 1957, inclusive, was 18 per cent.

It would seem that immediate benefits are not obtained when ground limestone is applied to fairly heavy sod but that yearly increases in production can be expected.

## Fertilizer gives high returns through beef

An average of 534 pounds of beef per acre was produced annually on fertilized dikeland pasture at the Experimental Farm, Nappan, N.S., during the 5-year period from 1953 to 1957, inclusive. Superphosphate and lime were applied annually in the spring at the rates of 200 and 1,000 pounds per acre, respectively. The grazing season averaged 141 days. This production was 53 per cent more than the average gains made on untreated dikeland pastures and 137 per cent more than those made on untreated upland pastures.

The extra gains on the fertilized upland and dikeland pastures were made at a cost for fertilizer and lime of \$3.50 per 100 pounds of live weight.

# Polled Ayrshires possible

More and more cattle breeders are deciding that horns are unprofitable and

while there are various dehorning devices available, it is much more convenient to have calves born without homs.

The Aberdeen Angus and Red Polled cattle are examples of naturally polled breeds but purebred polled strains have recently been developed in other breeds as well. The Experimental Farms Service has acquired a line of purebred polled Ayrshires and the imported polled sire "Clover Crest New Design" is now stationed at the Charlottetown Experimental Farm where his semen is available in the frozen state for other Experimental Farms. This bull carries excellent breeding for both milk and type and his daughters, now coming into production, are doing well. About 50 per cent of the calves sired by this polled bull are hornless and the Charlottetown Experimental Farm now has three generations of naturally polled Ayrshires in its herd.

#### SWINE

#### Yorkshire strain crosses show promise

The combining of two inbred Yorkshire strains continued at Fredericton during 1957 and the herd now consists mostly of second and third crosses. A.R. carcass scores are about average for the province, the cross generally being prepotent for large eye of lean but lacking somewhat in uniformity of backfat thickness and carcass length.

Average ages at slaughter in A.R. tests show that these hogs reach market weight around two weeks earlier than the average for Canada and that feed efficiency is superior to the national average.

#### POULTRY

## Confinement versus range rearing still questionable

In an experiment conducted at the Kentville Experimental Farm to measure the effect of confinement rearing versus range rearing on the performance of egg production birds, six strains of stock, involving 2,400 leghorns, were tested over a two-year period under uniform conditions and on a full-fed program. Throughout the laying period, records were taken for egg production, mortality, body weight, feeding efficiency, shell strength, internal egg quality, egg size, and incidence of blood and meat spots.

Although significant differences were noted for all traits measured between strains (with the exception of body weights and feed efficiency), there was no significant difference for these traits between the two rearing methods. Body weight differences did not exceed 0.2 pounds per bird and feed efficiency was 0.13 pounds of feed more per dozen eggs for the range-reared birds — differences low enough to be relatively unimportant in comparative poultry testing. Differences in feed costs during the rearing period amounted to 4 cents more per bird for the confinement-reared lot.

In a similar experiment conducted at the St. John's West Experimental Farm, involving 720 incross hybrid birds, confinement-reared birds were superior to the range-reared lot. Over a 14-month laying period, egg production was higher and mortality lower for birds reared in confinement, and range-reared birds required 0.3 pounds more feed per dozen eggs produced. Egg size, interior egg quality, and shell strength were not affected by the method of rearing.

## Restricted feeding can be overdone

Restricted feeding trials at the Nappam Experimental Farm in 1954-55 showed that light weight but healthy pullets could be reared on range when feed intake was cut to 75 per cent of full feeding. Similar results were obtained at the Charlottetown Experimental Farm during 1956 when pullets were reared on a diet restricted to 70 per cent of full intake. In both instances, restricted feeding had no ill effects on egg production or laying house mortality.

In further trials at Nappan during 1957, growing pullets on range were restricted to 63 per cent of full feeding with a resultant saving of 5.3 pounds of feed per bird. However, restricted birds were 1 pound lighter than full-fed birds at housing time (20 weeks) and egg production over a 336-day period was 10 per cent less than that of the full-fed lot.

Restricted feeding of pullets on range may therefore be sound practice at the 70 per cent level, but feeding at 63 per cent of full feeding cannot be recommended because of a very likely adverse effect on egg production.

## Lower protein levels effective

Extensive studies on the protein requirements of laying hens at Nappan indicate that levels lower than currently recommended may be adequate, contrary to results obtained in previous investigations. Rations containing as little as 13 per cent crude protein proved sufficient for egg production during recent trials and results showed that a proper balance of amino acids must be supplied in low protein diets. This work also confirms results of former studies which showed that levels of protein above 15 per cent are wasteful.

## Whole oats should not be fed too early

In a continuation of studies on restricting the feed intake of growing pullets, whole oats were fed as the sole diet to growing pullets on range at Nappan. Results indicate that caution must be exercised in introducing the whole oat diet. When introduced at 9 weeks of age the pullets suffered a setback and high mortality resulted. When introduced at 14 weeks the pullets grew quite well and mortality was not excessive. Whole oats may be fed as the sole diet to growing chickens on grass range from 14 to 20 weeks of age.

# Fish liver meal a good source of Vitamin B<sub>12</sub>

Fish liver meal is an important by-product of the fishing industry which can provide a fair source of protein for animal feed purposes. Recent studies conducted at Nappan show that it is also rich in available Vitamin  $B_{12}$  activity and may be used in chick rations as the sole source of Vitamin  $B_{12}$ .

## Rye can be used in chick rations

Rye is not generally considered to be a suitable feed for poultry but the introduction of the Tetra Petkus variety has prompted renewed interest in its use for poultry rations. Studies at Nappan indicate that 20 to 30 per cent rye may be included in chick rations since none of the adverse effects (soft droppings and pasting up) commonly attributed to rye were observed.

## Turkeys do better on mash and grain

Studies were conducted at Nappan to compare the efficiency of a growing mash and grain ration with an all-mash ration. The all-mash ration was made up by mixing ground grains half and half with the growing mash. One lot of turkeys was fed the all-mash ration while another lot was fed mash and whole grain and in both lots, feed was available to the birds at all times. The birds on the mash and grain rations consumed a larger percentage of grain as they grew older, which resulted in more economical gains. The greater energy requirements of turkeys as they grow older must be considered in any all-mash feeding program and the energy level of the ration must be increased as the birds approach maturity.

#### Fish silage can be fed to turkeys

In fish silage studies at Nappan, fish offal preserved with sulfuric acid was fed to turkeys on an all-grain and on a grain-mash ration. The feeding period was from 10 to 24 weeks of age and in both cases the turkeys consumed the fish silage quite readily and made good gains. On the grain-silage diet, silage accounted for about 17 per cent of the total feed consumed but on the grain-mash diet, this figure was reduced to 10 per cent. Mortality was high on the grain-silage diet.

Where fish silage is available, a small saving in feed will be obtained by providing turkeys with all the silage they will eat on a regular grain-mash diet. However, grain and fish silage alone do not appear to be adequate for growing turkeys.

## Southern exposure not essential

Laying test pens located on the north and south sides of the laying test house at Kentville were used to measure the "side of house" effect. Some 1,200 birds involving six Leghorn strains were used in this test and despite the relatively large differences between the performance of the different Leghorn strains, no significant differences were demonstrated between the production from birds in the pens located on the north and south sides of the house. Traits measured included egg production, mortality, body weight, feed efficiency, egg size, egg quality, shell strength, and incidence of blood and meat spots. Average egg production during the period was 225.2 for the birds on the south side compared with 225.1 for those on the north.

# Egg quality maintained at 30°F

A total of 460 eggs were used in an experiment at Kentville designed to test the effect of  $70^{\circ}F$  versus  $30^{\circ}F$  storage temperature on egg quality. A  $70^{\circ}F$ 

temperature was chosen since it was assumed that this was a common environmental temperature for eggs during marketing.

The test demonstrated that egg quality deteriorated more during one week at 70°F than it did during eight weeks at 30°F. After two weeks at 70°F egg quality had deteriorated to what was considered B grade or lower, whereas at the end of eight weeks in storage at 30°F egg quality was still being maintained at the A-grade level.

## Tranquilizing drugs for laying hens

Studies have been conducted at Nappan with a number of tranquilizing drugs and one of these, *Promethazine*, was tested on laying hens for the purpose of overcoming stress factors due to overcrowding. Egg production and shell quality were favorably affected by the addition of *promethazine* to the diet.

#### **CEREALS**

## Winter barley has possibilities

Winter barley, one of the less hardy winter cereals, has overwintered exceptionally well in the past three years at Kentville and at Illustration Stations in Western Nova Scotia. *Kenate* and *Wong* varieties were tested during this period, yielding an average of 32 and 15 bushels per acre, respectively. In a 1-year trial, *Hudson* produced the highest average yield of 37 bushels per acre.

Winter barley may not become popular in Nova Scotia because its persistant awn makes threshing difficult (a characteristic which appears to vary with the season). Probably the largest planting to date occurred at the Sheffield Farm, near Kentville, where slightly more than two acres of *Hudson* barley have been grown. *Kenate* has the least persistant awn of the varieties now under test.

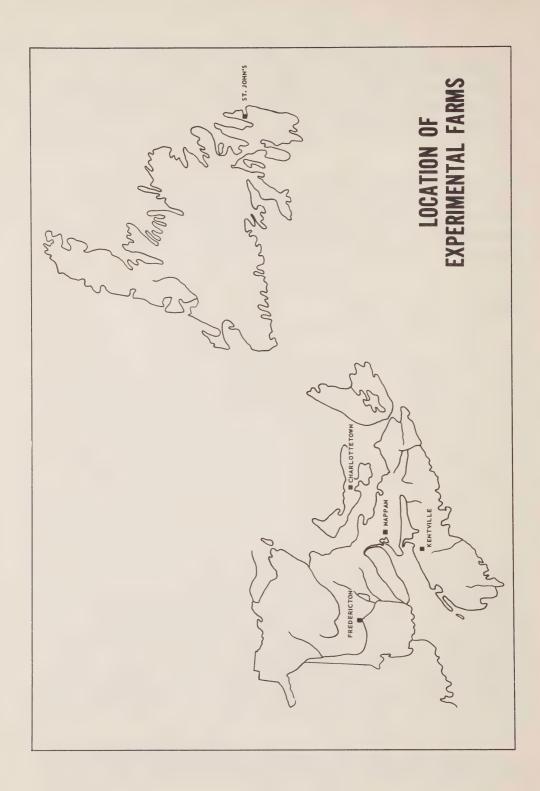
## Fundy oats perform well in the Maritimes

Fundy oats, a new variety, was first distributed to New Brunswick, Nova Scotia, and Prince Edward Island farmers in the Spring of 1957 and questionnaires to appraise its field performance were circulated during the fall period. Replies confirmed results of variety tests conducted by Experimental Farms and Illustration Stations in these areas and showed Fundy equal to Abegweit and superior to Ajax in yielding ability while maturing a week earlier than Abegweit and slightly earlier than Ajax. Average yields per acre reported for Fundy, Abegweit and Ajax were 58.1, 58.0, and 51.6 bushels, respectively. Growers reported Fundy maturing in 103 days and Abegweit and Ajax in 108 days.

Where early maturity is essential or advantageous, Fundy should replace Abegweit and Ajax since it fully equals the qualities of the former and outyields and produces a more attractive kernel than the latter.

# Variety important in winter wheat

The unusually severe winter of 1956-57 at the Nappan Experimental Farm showed the need for careful selection of winter wheat varieties. In the current



series of tests, from 6 to 16 varieties of winter wheat have been grown in each of the past three crop years with no important differences in productivity appearing in either of the first two years. However, during 1956-57, six promising varieties were totally destroyed and seven others were critically injured; only three varieties were hardy enough to continue to grow and produce satisfactory yields. Fortunately, these three varieties were among the top producers each year and listed in order of average yield are: *Rideau*, *Richmond*, and *Fairfield*.

## Jointworm and smut-resistant barley being bred

Although barley jointworm is no longer a serious problem in most areas of Prince Edward Island, it is still necessary for plant breeders and entomologists to continue their efforts to develop controls. The insect has been observed in isolated areas of New Brunswick, Quebec, and Ontario and under suitable environmental conditions it is conceivable that barley jointworm could become troublesome in these areas. Plant breeders at the Experimental Farm, Charlottetown, have developed a feed barley strain that has good resistance to the insect, and resistance to loose smut is presently being bred into this strain with the objective of having a suitable variety available should barley jointworm again reach epidemic proportion in any area.

#### FIELD HUSBANDRY

#### Time of nitrogen application important

Forage experiments conducted at Fredericton since 1950 show that 90 per cent of the yield increase from nitrogen applied in early spring occurs before the end of June and that nitrogen applied in early summer (late June or early July) results in increased yields during July and August. With phosphorus and potash applied in early spring, total forage yields were not affected but the seasonal distribution of yield was greatly improved by the later nitrogen application. Low rainfall in midsummer did not appreciably change the increase in yield resulting from the early summer application of nitrogen.

In tests carried on at Illustration Stations in Western Nova Scotia, nitrogen applied in early spring (at rates from 0 to 100 pounds per acre) did not produce increased second-cut yields, even at the higher rate. Later applications were effective in increasing late forage growth.

At the Nappan Experimental Farm, on a permanent pasture that had been in sod for 15 years, response to treatments of ammonium nitrate varied with the time and rate of application. Average yield increases (expressed as a percentage of the unfertilized area) were as follows:

Spring (May 1)	150 lb./acre	30%
Summer (July 1)	150 lb./acre	25%
Summer	300 lb./acre	51%
75 lb./acre (Spring) + 7	75 lb./acre (Summer)	30%

#### Fertilizer maintains forage yields many years

At Nappan, in an upland soil area which has been under fertilizer treatments for 27 years, the difference in forage growth between fertilized and unfertilized plots is striking. A vigorous grass sward (with some clover) has developed on the former while the latter bears only strawberries, rattle weed, poverty grass, and king devil. Fertilized plots have produced an average of 2 tons of hay per acre of very acceptable quality, whereas untreated check plots have produced 1,600 pounds of weeds and other worthless material.

## Fertilizers improve seasonal pasture production

Marshland pastures at Nappan that have received 200 pounds of superphosphate and 1,000 pounds of lime annually over a period of five years show an average annual production 62 per cent greater than unfertilized pastures. Comparative yields on the two areas varied throughout the grazing season with increases for five monthly periods from June to October being 34, 62, 189, 55, and 29 per cent, respectively.

It would therefore appear that application of superphosphate and lime helped to correct the normal mid-season drop in pasture production but that the effect did not carry over into the late summer and fall.

#### Fertilizer for oats

During the past two years at Nappan, oats have yielded an average of 9 bushels more per acre where 500 pounds of 6-12-12 per acre were applied instead of a similar amount of 3-15-6. This difference was obtained on large fields which were halved for fertilizer applications but which otherwise received uniform lime, seed, and cultural treatments.

At current prices, where the difference in cost between the two fertilizers is about \$10 per ton, 6-12-12 returned three to four times its additional cost in the value of oats produced.

#### Alder muck has value

In an experiment at the Charlottetown Experimental Farm, alder muck was compared with barnyard manure as a source of organic matter in a 4-year rotation of potatoes, barley, clover hay, and timothy hay. Alder muck alone, at 20 tons per acre, produced below average yields in all crops. However, yields from a combined treatment of 100 tons per acre each of alder muck and cow manure compared quite favorably with those obtained from 20 tons of cow manure per acre.

## Lime can be applied at any time

Over a period of twelve years lime has been applied on a four-year rotation at Nappan in the following ways:

- 1. Three tons worked into the soil before swede turnips
- 2. Three tons worked into the soil before oats
- 3. Three tons applied on the surface on oat stubble
- 4. Three tons applied, half on the timothy sod plowed under for swede turnips and half worked into the soil before oats

The response during the first cycle of the rotation was definitely in favor of the first two treatments but as the rotation was repeated, differences disappeared and all treatments reacted similarly.

## Oats yield well when grown continuously on marshland

Oats have been grown continuously on marshland at Nappan for the past five years. Although yields have fluctuated with seasonal conditions, they have shown no sign of declining and were higher in 1957 than in any previous year.

The application of 2 tons of limestone and 200 pounds of superphosphate per acre every fourth year has increased the average yields from 44 to 61 bushels per acre, or a gain of almost 40 per cent.

## Lime increases cereal yields

Preliminary tests conducted at the Cormack (Newfoundland) Illustration Station show that cereals grown on acid soils respond markedly to added lime. When lime was applied at the rate of 2 tons per acre, yield of oats, barley, and wheat were increased by 21, 48, and 150 per cent over check yields of 34.8, 7.4, and 4.0 bushels per acre, respectively.

## Fertility requirements vary with soil type

Fertility studies conducted on Illustration Stations in northeastern Nova Scotia over the past three years indicate that different soil types vary in their response to applied fertilizers. The light, stony Woodbum and Kirkhill soil types require a complete NPK fertilizer for satisfactory out production, but in hay fields, the former responded significantly to nitrogen and phosphorus while the latter showed a greater response to phosphorus and potash. For the Pugwash soil type, outs responded significantly to nitrogen applications whereas nitrogen and potash were necessary for best hay growth.

#### Lime essential for acid soils

Liming trials conducted by the Nappan Experimental Farm have indicated that lime is necessary for high crop production and legume seedling establishment on acid Maritime soils.

When sufficient lime was added to an area of acid *Tormentine* sandy loam to raise the soil pH from 4.8 to 6.0, the yield of oat silage was raised from 850 to 2,600 pounds of dry matter per acre. With the addition of 500 pounds of 0-20-20 plus 100 pounds of ammonium nitrate per acre, yields on unlimed and limed plots were further increased to 2,300 and 4,200 pounds of dry matter per acre, respectively. The combined treatment of lime plus fertilizer therefore boosted the yield of the unlimed area by 500 per cent.

On another area of acid *Tormentine* sandy loam, similar lime treatment was applied to raise the soil pH from 4.8 to 6.0. Alfalfa, red clover, alsike, and grass were then seeded down and growth was checked against a similar seeding on untreated soil. Where lime was applied, an excellent establishment of legumes and grass occurred whereas only a sparse covering of some grasses and weeds appeared

on the unlimed sections. Application of commercial fertilizers without first liming the soil to a favorable pH level was not sufficient to promote establishment of legume seedlings, although it did noticeably improve the establishment of grasses.

## Couch grass control possible

Two new weedicides, *dalapon* and *amino-triazole*, have provided good control of couch grass and other weeds in tests conducted over the past few years at several Maritime Experimental Farms.

Experimental results at Fredericton indicated that *dalapon* applied at rates of 4 and 8 pounds of actual *dalapon* per acre (just prior to the emergence of potatoes) reduced the stand of couch grass to 35 and 10 per cent, respectively, when check plots (no weedicide) had a uniform stand covering 70 per cent of the area. There was no measurable reduction in potato yields nor was there any apparent change in tuber starch content. In tests with raspberries, good control of couch grass was obtained with two applications of *dalapon*, each at the rate of 5 pounds of material per acre. The first treatment was made in spring when grass growth was well advanced, but before the raspberries were in full leaf. The second treatment followed about two weeks later. It was found that such a split application was more effective than a single spraying at the same or a higher rate and that if the spray was directed downward, no injury occurred to raspberries at these levels.

Trials at Kentville, using dalapon and amino-triazole at rates of 5, 10, 20, and 40 pounds per acre applied to separate areas in fall and spring, showed that 10 pounds of either chemical gave a fair measure of couch grass control. Two weeks after the spring treatment, both areas were cultivated and planted to potatoes, peas, snap beans, sweet corn, onion sets, red beet, and carrots. Yields of potatoes and peas were not affected by any of the treatments and, except for onions, no symptons of injury from the chemical treatment were observed on the other crops. Onions showed amino-triazole injury on all spring-treated plots and also on fall-treated plots which had received 10 pounds or more per acre. It would therefore seem that spring treatment with either chemical would be safe for the crops listed provided 2 to 3 weeks elapsed between treating and planting. Amino-triazole should not, however, be used prior to planting onions.

At the Charlottetown Experimental Farm, extensive tests with amino-triazole gave excellent and permanent kill of grasses and weeds when applied to asparagus at 8 pounds per acre immediately after the cutting season ended. Applied to native cranberries at the same rate just prior to bloom, it provided excellent control of grasses and most broad-leaf weeds. There was no evidence of serious damage to asparagus roots, and cranberry vines showed only minor injury. Amino-triazole was also effective in controlling couch grass in garden areas when applied at the 8-pound rate two weeks before seeding and may have considerable value for cleaning up strawberry areas infested with this weed.

#### Value of plastic cover for horizontal silo doubtful

At Nappan, during the summer of 1956, a plastic cover was used to seal a horizontal silo filled with grass silage. The following winter was exceptionally cold and frost penetrated the cover for about 6 inches before it was removed during a January thaw. While no spoilage was apparent on the surface, the top 6 inches of silage was odorless and tasteless and cattle refused to eat it.

The plastic cover was damaged by weathering and handling and required extensive repairs before it could be used again. For one year of use, the cost of the cover amounted to approximately 50 cents per ton of silage made.

#### FOR AGE CROPS

## Alfalfa valuable in hay mixture

In a three-year trial on the Illustration Stations of western Nova Scotia, when alfalfa was included in the seed mixture, yields of dry matter and crude protein were increased at all locations. Mixtures containing alfalfa gave a larger yield of dry matter and crude protein during mid-season than did mixtures of *Red Clover*, *Alsike* and *Timothy*.

#### Rhizoma best alfalfa for Newfoundland

Tests conducted at three Newfoundland Illustration Stations show that where sufficient lime (2 tons per acre) is applied, alfalfa can be grown successfully. *Rhizoma* appears to be the most suitable variety since in six tests over a three-year period it has averaged 1.77 tons of dry matter per acre — almost double that of *Grimm* or *Ontario Variegated*.

At St. John's West, *Rhizoma* outyielded eleven other varieties and in three test years produced an average annual yield of 1.82 tons of dry matter per acre.

## Oats for forage in Newfoundland

Almost all oats grown in Newfoundland are cut green for hay or silage purposes. In tests conducted at four Illustration Stations, the tall, leafy variety *Roxton* has outyielded all other varieties by nearly one-half ton of dry hay per acre.

## Lupin seed production questionable

Tests conducted during the past two years at Nappan indicate that there is little possibility of successful lupin seed production in that area. Five varieties were grown for two years and although growth was luxuriant in all varieties, little seed was formed. In 1956 a root-rot disease caused severe losses in all plots and an unusually early frost destroyed all plants. In 1957, after an early planting and a prolonged frost-free period, a seed set only slightly better than the previous year was obtained. Vegetative growth continued until plants were frozen but no harvestable amount of seed was produced by any variety.

At Fredericton, although good yields of seed were obtained in each of the past two years, indications are that lupin seed production would be a precarious

crop for New Brunswick. The earliest variety tested required 155 days to mature in 1956 and 138 days in 1957. The average frost-free period in the Fredericton area is only 129 days and most of the remainder of the province has an even shorter. period. Fall frosts would therefore seriously reduce the quality and quantity of this crop from time to time. In addition to this hazard, lupins are slow starting in spring and need to be sown in rows to enable proper cultivation for weed control. They are also susceptible to wilt and aphid infestation, both of which drastically reduce yields.

#### Roadsides can be protected by seeding

The Charlottetown Experimental Farm has recently conducted extensive tests to compare a number of grass-clover mixtures for use in protecting erodable back-slopes and ditches on newly constructed highways. Results indicated that the following seed mixture was suitable for most conditions when applied at the rate of 50 pounds per acre:

Kentucky bluegrass	60
Red top	25
Perennial rye grass	10
White Dutch clover	5

Since the fertility level in such areas was relatively low the following fertilizer treatment was found to be most effective:

6-12-12 Commerical fertilizer	1,000 pounds per acre
Hydrated lime (quickly available)	1,000 pounds per acre
Ground limestone	1,000 pounds per acre

#### SMALL FRUITS

#### Wild strawberries not a virus disease threat

A province-wide survey conducted by the Kentville Experimental Farm in cooperation with the Nova Scotia Research Foundation indicates that wild strawberry plants in Nova Scotia are very limited carriers of strawberry virus diseases.

Wild strawberry plants were collected from 32 sites in 12 widely separated areas of Nova Scotia and of the 354 plants obtained, 201 were successfully runner grafted to *Fragaria vesca* indicator plants. Only six plants expressed virus symptoms and of these, four were collected in areas immediately adjacent to commercial strawberry fields and two in secluded areas where there were no known commercial strawberry plantings.

## Treated strawberry plants make superior growth

During the second week of November, 1956, a number of strawberry plants were dug and placed in a 27°F storage room at the Kentville Experimental Farm. The plants were first cleaned and placed in polyethylene bags without additional packing material and then held until May 1957. At that time they were removed from storage, dipped in water at 127°F for two minutes (to destroy nematodes and other insects) and shortly afterwards planted in fumigated soil. The hot water

treatment did not depress plant vigor, as might have been expected, and growth of all treated plants during the 1957 growing season equalled or exceeded that of plants freshly dug and set out in spring.

## Strawberry yields check effectiveness of soil fumigants

At the Kentville Experimental Farm in 1957, three liquid soil fumigants (Vapam, D.D., and Nemagon) were given a preliminary evaluation based on results obtained from singly treated observational type rows of Premier and Senator Dunlap strawberry plants. Plots were placed on land that had produced a number of strawberry crops and in which the meadow nematode (Pratylenchus penetrans) was known to be prevalent.

Root samples collected at fruiting time indicated that these chemicals provided effective nematode control. Roots from treated plots contained few or no nematodes whereas roots from untreated plots had as many as 5,000 nematodes per gram of roots. The increase in fruit yield of the treated plots over that of the untreated plots was as follows: Vapam -198%, D.D. -237%, and Nemagon -171%.

## Blueberry plantations respond to burning

Experiments have been conducted at the Alliston Illustration Station (Prince Edward Island) over the past six years to determine the interval at which blueberry plantations should be burned. Three treatments were used, with the following yield results:

Unburned: 468 pounds berries per acre
Burned every second year: 1,600 pounds berries per acre
Burned every third year: 1,299 pounds berries per acre

Satisfactory burns were obtained by spreading a thin layer of straw over plantations, preferably in the fall, and firing the strawed areas at an appropriate time in spring. Burning removed dead and old wood on blueberry plants and also aided in the control of blueberry fruit maggot.

#### Rust-resistant black current

Observations made at the St. John's West Experimental Farm during the past five years indicate that the black currant variety *Consort* is highly resistant to rust disease under Newfoundland growing conditions. *Consort* was also the highest yielding variety and displayed the greatest winter hardiness.

## Blueberries respond to fertilizer treatment

In two years of testing at the Avondale Blueberry substation (Newfoundland), applications of ammonium nitrate and 6-12-6 commercial fertilizer have resulted in earlier maturity and ripening of blueberries. Added nitrogen was at least partly responsible for significantly increased yields in the first picking and lack of nitrogen apparently caused the higher percentage of green berries found in check plots at the time of last picking.

Other observable fertilizer effects were: increased vigor of blueberry plants, distinctly darker green blueberry foliage, and encouragement of grass growth. The

latter effect is important in Newfoundland where straw is not usually available and where it is difficult to burn blueberry areas without dry grass to carry the fire.

#### Forced or frozen rhubarb

At the Kentville Experimental Farm, a judging panel found that sauces made from forced rhubarb were more acceptable in both color and flavor than sauces made from garden fresh rhubarb preserved by freezing (with or without sugar or sauces). Of the six varieties used, Sunrise and Valentine were the most acceptable, followed by Ruby, Macdonald, Jersey, and Strawberry. Valentine and Sunrise sauces frozen raw obtained higher color scores than those made from forced Strawberry, Jersey, and Macdonald varieties.

### TREE FRUITS

## Apple orchard culture influences tree nutrition and fruit storage quality

An experimental orchard was planted at the Kentville Experimental Farm to test the effect of various cultural practices on the growth and yield of apple trees and on the storage quality of the fruit. The leaves removed from trees grown on these plots were analysed chemically for their nutrient content. The six cultural practices may be classified into two main groups: (1) permanent covers which include grass, grass mulch, and ladino clover and (2) annual covers which include buckwheat, weeds, and vetch. There were significantly fewer misshaped apples from trees grown under permanent sod and this characteristic was associated with low levels of foliar nitrogen.

The corresponding storage data indicate that fruit from trees under permanent cover kept best. These apples were given a high quality rating (color, flavor, and texture), were high in acid content, and relatively resistant to storage rots.

## Amino-triazole controls weeds around young apple trees

Tests at Kentville over a period of two years (1956 and 1957) showed that couch grass, goldenrod, and wild carrot could be satisfactorily controlled with an annual application of amino-triazole. Ten pounds per acre of 50 formulation, applied as a spray in the spring after weed growth had started, gave almost complete control of weeds. Newly planted apple trees in the plots treated with amino-triazole made nearly as good growth as those in plots where all weeds were removed by hand hoeing, and somewhat better growth than trees in plots weeded with a mechanical hoe. Equally good control of couch grass was obtained with 10 pounds per acre of dalapon (70 formulation), but this material gave no control of goldenrod or wild carrot. Apparently due to this weed competition the trees in the dalapon-treated plots made much less growth than those in plots treated with amino-triazole. After two annual treatments at rates of 20 pounds per acre there was no evidence that the trees were injured by either of the chemicals.

## Diffusion of ascorbic acid in apple sauce

Because of present interest in "vitaminized" apple juice, the possibility of increasing the vitamin content of apple sauce by addition of ascorbic acid was

investigated in a local cannery at Kentville. It was found that little destruction of vitamins occurred when solutions containing ascorbic acid were injected into the filled cans just before sealing, but subsequent processing operations did not achieve adequate dispersion throughout the contents of the can.

Diffusion in storage was found to be slow, a period of 96 days being required before the concentration of ascorbic acid in the top, center, bottom, and liquid portions of the contents approached an equivalent value. During this time, total vitamin content of the sauce fell from 50 to 41.9 milligrams per 100 grams.

#### **VEGETABLES**

#### Tomatoes respond to nutrient sprays

For the third year in succession, increased yields of tomatoes have been obtained at Kentville by using sprays containing 5 pounds of potassium nitrate per 100 gallons of water. Three sprays were applied at weekly intervals commencing one week after planting.

## A canning tomato for Nova Scotia

For some years Nova Scotia tomato growers have sought a variety that would appeal to both the fresh fruit and the processor markets. The new variety Scotia appears to fill both these requirements.

During 1957 a semi-commercial trial was conducted by the Kentville Experimental Farm in co-operation with an Annapolis Valley processing company. Plants were set out in the first week of June and two harvests were made, on September 18 and 25. The total yield of usable ripe fruit was 10.7 tons per acre. More fruit subsequently ripened on the vines but these yields were not included because tomato harvests after September 25 tend to be uncertain. The cannery obtained a recovery of slightly less than one case of twenty-four 20-ounce cans per bushel (45 pounds) of fruit harvested and all canned fruit graded "Choice".

## Black plastic mulch not recommended for tomatoes

In tests at the Kentville Experimental Farm over a two-year period, 1.5 mil black polyethylene plastic (36 inches wide) has been compared with sawdust and a "no mulch" treatment on ridged and flat rows for the production of tomatoes. Additional nitrogen was added to the sawdust to replace the amount lost through bacterial activity.

Mean soil temperature readings were highest under the plastic mulch, followed by the "no mulch" and sawdust treatments. Mean soil moisture values were highest in sawdust, followed by "no mulch" and plastic. In the production of early ripe fruit, sawdust gave the highest yield but plastic produced the highest total yield. The amount of unmarketable fruit was also higher from the plastic covered plots.

From these results it is apparent that black plastic is not effective in significantly increasing the production of early ripe tomatoes.

## High temperatures produce early tomatoes but reduce yields

In a test at the Kentville Farm tomato seedlings were grown continuously at a minimum temperature of 70°F prior to setting. These were compared with check plants that were given a four-week period at 70°F followed by two weeks in the cold frame with variable temperatures.

The earliest ripe fruit (125 days from seeding) was produced on the seedlings grown at 70°F. After a period of 140 days the plants grown at 70°F had produced the smallest yield and at 170 days, yields were only 58 of the check plants.

### Individual plant containers not advantageous

Tomato plants were started and grown in the greenhouse at the Kentville Experimental Farm in the following manner: (1) soil blocks, (2) Vita Band D., (3) Vita Band 10, (4) Vita Green Pots, (5) Jiffy Pots, (6) in flats and later sectioned out with a spade at setting out time, and (7) in flats and pulled out at setting out time. All plants were set out in the first week of June.

Up to August 29 all treatments gave equal production of ripe fruit. There were no differences in final yields of total ripe fruit or total ripe and green fruit. Results were consistent for two years and indicated that transplanting from individual plant containers provided no advantage over transplanting from standard flats.

## Peas not injured by MCP(B) or 2,4-D(B)

In 1957 two new chemicals, MCP(B) and 2,4-D(B) (related to MCP and 2,4-D), were given an extensive trial at Kentville as herbicides for weed control in peas grown for canning. When applied at rates up to 24 ounces per acre (acid equivalent), pea yields were not reduced significantly below those from untreated controls.

In a parallel test MCP(B) and 2,4-D(B) were applied to several species of weeds. Wild white clover was not injured but lamb's-quarters, pigweed, and wild radish were killed. It would therefore appear that these chemicals have a place as post-emergence herbicides in pea plantings where lamb's-quarters, pigweed, and wild radish are major weed species.

## Anthraxylate possible substitute for manure on sandy soils

"Anthraxylate" is a humus-like material which may be produced from coal as a by-product in certain industrial processes. Using material provided by the Nova Scotia Research Foundation, experiments conducted at Kentville on some sandy soils of the Annapolis Valley have indicated a beneficial effect on yields of several vegetable crops. Yields of sweet corn and head lettuce were increased substantially, and, in the greenhouse, growth of cucumber plants was greatly improved by anthraxylate treatment.

# Broccoli grows well in Newfoundland

Broccoli variety trials over the past five years at the St. John's West Experimental Farm show that Waltham 29 is most satisfactory for Newfoundland growing conditions. It produces firm, compact, central heads with many lateral shoots of

good quality, and growth persists throughout the late summer and fall.

Broccoli is not widely grown in Newfoundland but since a relatively large quantity is imported yearly it is felt that local production could be profitable.

#### **POTATOES**

#### Close spacing recommended for Keswick potatoes

Spacing trials at Fredericton indicate that close planting of the *Keswick* potato will greatly reduce the proportion of over-sized tubers and result in an improved product for table use. Results are based on two years of replicated field trials in which both small whole tubers and cut sets were planted at spacings of 6, 8, and 10 inches.

With cut sets, the 8-inch spacing gave the highest yield of marketable tubers in both years of the trial. For small whole seed, the greatest yield was obtained with 8-inch spacing in the first year of the trial, but in the second year 6-inch spacing was superior.

The experiment was conducted on a soil of medium fertility to which had been added 1,700 pounds of 6-12-12 fertilizer per acre. It is probable that in a soil of high fertility a spacing of 6 inches would be more effective than 8 inches.

## Nitrogen essential on acid peat soils

At the Kentville Experimental Farm, results of two years of replicated trials on the peat bog at Aylesford, N.S., have provided information concerning fertilizer requirements for potato production on acid peat soils.

Tests were placed on a drained peat area that had been treated with 8 tons of dolomitic limestone per acre and thoroughly rototilled. The acidity of the soil in the surface 6 inches was slightly over pH 5.0 after lime had been added. Fertilizer treatments to obtain maximum yields of good quality tubers consisted of 6-12-6 (or 6-12-8) applied at 2,000 pounds per acre followed by 300 pounds of ammonium nitrate per acre at planting (or as a side dressing one month later). The extra nitrogen was apparently necessary for proper sizing since an extremely heavy set is generally obtained. Total potato yields equivalent to 475 and 645 bushels per acre were produced in the two test years.

## Breeding potatoes for resistance to late blight

Late blight is one of the most serious diseases affecting the potato crop in Eastern Canada. Attacking both the foliage in the fields and the tubers in storage, it drastically reduces yields in epidemic years and greatly increases costs of production by necessitating expensive spray control measures.

All existing blight-resistant varieties of potatoes (including Keswick, Cherokee, and Kennebec) carry only one of the four or more major genes for resistance to late blight. Since each gene confers resistance to specific races of the blight organism, an attempt is being made at Fredericton to combine all four genes in a single variety. Individual seedlings carrying these genes have been

originated but none have shown any commercial promise. However, commercial-type seedlings with two and even three genes for resistance are under close observation at the present time.

Efforts are also being concentrated on breeding for the field type of resistance such as is carried by the variety Sebago. This is different from the major gene resistance mentioned above in that such varieties, although actually susceptible, do not succumb so readily to the disease. Varieties and seedlings have been found that carry a higher degree of resistance than Sebago, and an improved method for determining field resistance has been developed.

#### A new source of resistance to common scab

Common scab of potatoes is a disease of considerable economic importance in Eastern Canada. Although reaching severe proportions only in restricted districts, it is of major importance in all commercial growing areas, since fear of this disease is responsible for growers applying less lime than is necessary for maximum production of other crops in the rotation.

The German varieties Hindenburg, Richter's Jubel, and Amica have been used extensively for many years by potato breeders as a source of scab resistance. These varieties have a serious shortcoming in that they are susceptible to internal necrosis, and this susceptibility appears to be linked with scab resistance.

Fredericton seedling F4724, which has no known scab resistance in its parentage, has been found to be highly resistant to scab. Field and greenhouse trials have shown that this seedling is not susceptible to internal necrosis and that it passes a high degree of scab resistance to its progeny. Of 91 progeny tested, 49 showed resistance equivalent to Russet Burbank while 9 possessed resistance comparable to Hindenburg. This evidence indicates that F4724 offers to breeders a new source of scab resistance superior to that presently available.

#### Herbicides can have harmful residual effects

Results of tests at the Fredericton Experimental Farm indicate that the new herbicide TBA (trichlorobenzoic acid) can have a long-term residual effect. Applied as a pre-planting weed treatment (at the rate of 2 pounds per acre, acid equivalent) 11 days before setting out potatoes, it severely distorted potato tops and reduced yields to 20 bushels per acre. When the treated area was planted to potatoes again in the following year, tops were again severely distorted and yields were reduced by as much as 25 per cent.

#### Chipping trials important

The importance of the potato chip industry in the Maritime Provinces is increasing yearly and as a result there is a great demand for potato varieties that will make a high quality product.

With this in view, all seedlings that survive three years of field trials in the National Potato Breeding Project at Fredericton are subjected to chipping tests. Through these tests, seedlings are selected that will produce good chips in late

summer and fall and that will recondition satisfactorily in the shortest time during winter. Further selection should result in new potato varieties, superior to existing varieties in chipping qualities, being made available in the near future.

# SUBJECT INDEX

Subject	Pages
Alfalfa	21
Apples	24
Barley	15,17
Bees	10
Beef cattle	10,11,12
Black currants	23
Blueberries	23
Canning crops	25
Chemical weed control	20,24,26,28
Dairy cattle	11
Egg quality	14
Fertilizers and manures	11,17,18,19,26,27
Grass mixtures	22
Oats	15,19,21
Peas	26
Plastic mulch	25
Potatoes, culture and fertilization	27,28
Potato diseases	27,28
Potato varieties	28
Poultry management	12,14
Poultry nutrition	13,14,15
Rhubarb	24
Seed production	21
Silos and silage	10,21
Soil fumigant	23
Strawberries	22,23
Swine	12
Tomatoes	25,26
Vegetable varieties	26
Virus disease	22
Vitamin C	24
Winter wheat	15



EDMOND CLOUTIER, C.M.G., O.A., D.S.P. QUEEN'S PRINTER AND CONTROLLER OF STATIONERY OTTAWA, 1958

Cat. No. A56-2957